

# NAS NORTH ISLAND - NAVY REGION SOUTHWEST NAVY ENVIRONMENTAL LEADERSHIP PROGRAM

## CLEANUP

### DMLS™-MULTI-LAYER GROUNDWATER SAMPLING

#### LEAD ACTIVITY

Southwest Division Naval Facilities Engineering Command (SWDIV)

#### STATUS

Complete

#### MISSION

Provide in situ real-time groundwater sampling and analysis

#### REQUIREMENT

Remediation efforts at Navy sites require periodic groundwater sampling. A device is required to determine a vertical profile of groundwater contaminants.



Dialysis Cell

#### DESCRIPTION

Naval Air Station (NAS) North Island is demonstrating the Diffusion Multi-Layer Sampler (DMLS™) at Installation Restoration (IR) Site 9 as part of a groundwater remediation effort. The DMLS™ is a passive, multi-layer sampling device based on dialysis cell technology. The dialysis cell is a polypropylene vial filled with distilled water and covered by permeable membranes at both ends. When a dialysis cell is exposed to groundwater with concentrations of solutes different from that inside the cell, a natural process of diffusion of solutes from higher concentrations to lower concentrations occurs.

The DMLS™ consists of a rod (or connected rods) with openings at specific intervals to accommodate the proprietary dialysis cells. Each cell is an independent sampling unit, separated by flexible seals that fit the inner diameter of the well. At this point the cell contains a representative sample of the groundwater from a narrow layer of the aquifer.



DMLS™ Sampling at NAS North Island

At IR Site 9, NAS North Island is applying NoVOCs™ in-well stripping technology (see NoVOCs™ In-Well Stripping Technology) for groundwater remediation. Periodic sampling of the groundwater is necessary to monitor the remediation efforts. In May

1998, a demonstration of the DMLS™ was conducted at an existing monitoring well to determine the levels of contaminants in the groundwater. Samples were collected from a monitoring well located approximately 100 feet upgradient of the NoVOCs™ treatment well. Results from the demonstration at NAS North Island indicate that the DMLS™ device detects contaminants at multiple layers within the well, providing a detailed vertical profile of the contaminated area.

## **BENEFITS**

- No purging or external energy source is required because sampling is accomplished through natural diffusion across the membrane
- Since no well purging is required, there is a reduction in generation of investigation-derived waste
- The DMLS™ is extremely precise; layer intervals can be defined as close as 3 inches with no cross-contamination occurring between samples. All layers are sampled concurrently within a well
- Because cells are sealed upon retrieval from the well, alteration or contamination of samples is virtually impossible, maintaining high sample integrity
- The DMLS™ is portable and can easily be moved from well to well for comprehensive and accurate groundwater sampling at any given site

## **ACCOMPLISHMENTS/CURRENT STATUS**

<b>Date</b>	<b>Activity</b>
MAY 1998	DMLS™ sampling device demonstrated at Site 9
JUL 1998	Demonstration project results submitted
SEP 1998	Site profile of contaminants continued at Site 9
JUN 1999	Performed cost benefit study for use of DMLS™

## **FUTURE PLAN OF ACTION & MILESTONES**

Not Applicable

## **COLLABORATION/TECHNOLOGY TRANSFER**

U.S. Filter/Johnson Screens developed the DMLS™ groundwater-sampling device. Bechtel conducted the sampling program for Southwest Division at NAS North Island.

## **BIBLIOGRAPHY**

- Vendors Brochure: "Advanced Technology for Precise Groundwater Sampling" DMLS™
- The Passive Multi-layer Sampler, Johnson Screens.
- Bechtel, DMLS™ Demonstration Project Results. July, 1998.

## **RELATED GOVERNMENT INTERNET SITES**

None available

## **RELATED NAVY GUIDEBOOK REQUIREMENTS**

02039 Solid Waste Management Unit (SWMU) Cleanup

*UPDATED: 01/23/02*